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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/028,433	12/28/2001	Young-Sang Byun	3430-0175P	4398
2292	7590	12/27/2007	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH			DUONG, THOI V	
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NOTIFICATION DATE		DELIVERY MODE		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/028,433	BYUN ET AL.
	Examiner Thoi V. Duong	Art Unit 2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 02 November 2007.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1,2,4,7-10 and 12-24 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1,2,4,7-10 and 12-24 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO/SB/08)  
     Paper No(s)/Mail Date \_\_\_\_\_.

4) Interview Summary (PTO-413)  
     Paper No(s)/Mail Date. \_\_\_\_\_.  
 5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_.

## **DETAILED ACTION**

1. This office action is in response to the Amendment filed November 02, 2007.

Accordingly, claims 1, 9, 22 and 24 were amended, and claims 3, 5, 6 and 11 were cancelled. Currently, claims 1, 2, 4, 7-10 and 12-24 are pending in this application.

### ***Response to Arguments***

2. Applicant's arguments with respect to claims 1 and 9 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2, 4, 9, 10 and 12-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over von Gutfeld et al. (von Gutfeld, USPN 6,055,035) in view of D. E. Damouth (USPN 3,512,173).

Re claim 1, as shown in Figs. 2A, 2B and 3, von Gutfeld discloses a method of forming a liquid crystal layer on a substrate, comprising:

preparing a liquid crystal material in a projecting portion 20 comprising a nozzle fixture 21 and a LC source 23;

applying a pressure to the projecting portion 21 so as to emit the liquid crystal material (col. 5, lines 11-65);

moving the substrate 1A in one direction (col. 6, lines 8-14); and  
depositing the liquid crystal material from the projection portion 20 uniformly onto  
the substrate during the moving of the substrate in the one direction (col. 5, lines 30-37).

Re claim 9, as shown in Figs. 1, 2A, 2B and 3, von Gutfeld discloses an  
apparatus for forming a liquid crystal layer on a substrate, comprising:

a projecting portion 20 having a nozzle plate 21 containing a nozzle aperture 22  
for emitting a liquid crystal material; and  
a stage 1 for moving the substrate 1A in one direction during emitting of the liquid  
crystal material from the projecting portion 21 uniformly onto the substrate (col. 5, 30-37  
and col. 6, lines 8-14).

Von Gutfeld discloses a method of forming a liquid crystal layer on a substrate  
that is basically the same as that recited in claims 1 and 9 except for a resonator for  
applying an on voltage during emitting of the liquid crystal material to generate a  
vibration with only a specific frequency by the resonator so as to apply a pressure to the  
projecting portion to emit the liquid crystal material from the projection portion; and a  
resonating plate placed between the resonator and the projecting portion and outside of  
the projecting portion, wherein the generated vibration is transmitted from the resonator  
to the projecting portion through the resonating plate such that the resonating plate  
vibrates with the same specific frequency.

As shown in Fig. 1, Damouth discloses an ink-jet system comprising:  
a resonating plate 18 (mechanical structure) located between a resonator 17  
(piezoelectric crystal) and a projecting portion 10 (conduit) and outside of the projecting

portion, wherein an on voltage is applied to the resonator 39 during emitting of the liquid material 15 to generate a vibration with only a specific frequency by the resonator 17 so as to apply a pressure to the projecting portion 10 to emit the liquid material 15 from the projecting portion 10,

wherein the generated vibration is transmitted from the resonator 10 to the projecting portion 10 through the resonating plate 18 such that the resonating plate vibrates with the same specific frequency (col. 2, lines 3-50).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of forming a liquid crystal layer on a substrate of von Gutfeld with the teaching of Damouth by employing a resonator and a resonating plate placed between the resonator and the projecting portion and outside of the projecting portion for generating a vibration with only a specific frequency upon application of an on voltage during emitting of the liquid crystal material so as to apply a pressure to the projecting portion to emit the liquid crystal material from the projecting portion, wherein the generated vibration is transmitted from the resonator to the projecting portion through the resonating plate such that the resonating plate vibrates with the same specific frequency in order to effectively control size and break-up rate of the emitting material stream to produce the uniform droplets (col. 2, lines 46-50).

Re claims 2 and 10, as shown in Fig. 2A, von Gutfeld discloses that the projecting portion 20 has a nozzle plate 21 (fixture) containing a plurality of orifices 22, said nozzle plate adjusting the applied pressure for emitting the liquid crystal material,

the liquid crystal material being emitted through the plurality of orifices (col. 5, lines 30-58 and col. 7, lines 47-55).

Re claims 4 and 13, von Gutfeld discloses that the liquid crystal material is emitted and deposited in a vacuum chamber 60 (Figs. 6 and 7, and col. 7, lines 36-55); accordingly, it is obvious that the vacuum chamber encompasses the projection portion, the resonator and the resonating plate used to emit the liquid crystal material.

Re claims 15 and 16, as shown in Figs. 2B and 3 of von Gutfeld, the volume of the emitted liquid crystal material is adjusted by a CPU 25 to obtain the correct amount of the liquid crystal material deposited on the panel 1A according to a position of the nozzle plate 21 or the moving substrate (col. 5, line 50 through col. 6, line 14). Accordingly, it is obvious that the CPU 25 is operated by an on voltage according to a position of the nozzle plate 21 or the moving substrate so as to allow a uniform amount of the liquid crystal material to be ejected through the nozzle plate (col. 5, line 50 through col. 6, line 14).

Re claim 12, as shown in Fig. 3, since von Gutfeld discloses that the stage 1 is moved in relation to a fixed projection portion 20 (col. 6, lines 8-14), it is obvious that means is provided for moving the stage.

Re claim 14, Damouth discloses that means 16 (potential source) is provided for generating vibration in the resonator 17 (col. 2, lines 42-46).

Re claims 17 and 19, Damouth discloses that the liquid material is emitted from the projecting portion by only the pressure applied to the projecting portion (col. 2, lines 3-16).

Re claims 18 and 20, Damouth discloses that the liquid material is emitted from the projecting portion by the pressure applied to the projecting portion without applying an electric field to the liquid material during emitting of the liquid material (col. 2, lines 3-50).

Re claims 21 and 23, as shown in Fig. 1, Damouth discloses that the resonating plate 18 is placed between the resonator 17 and the projecting portion 10 such that a first surface (left surface) of the resonating plate 18 is in contact with the resonator 17 and a second surface (right surface) of the resonating plate 18 is in contact with an upper surface (left surface) of the projecting portion 10,

wherein, re claims 22 and 24, as shown in Fig. 1, the resonating plate 18, is spaced apart from the liquid material 15 by the projecting portion 10.

5. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over von Gutfeld et al. (von Gutfeld, USPN 6,055,035) in view of D. E. Damouth (USPN 3,512,173) as applied to claims 1, 2, 4, 9, 10 and 12-24 above, and further in view of Masazumi et al. (Masazumi, USPN 6,331,884 B1).

As shown in Fig. 4, von Gutfeld discloses at least of of the substrates, 1A or 1B, having a sealed pattern 41 (col. 7, lines 24-27). However, von Gutfeld as modified in view of Damouth does not disclose a black matrix formed under the sealed pattern, wherein the liquid crystal material start and stop is deposited on the black matrix as recited in claims 7 and 8.

As shown in Fig. 5, Masazumi discloses a black matrix 8 (black light absorbing layer) formed under a sealed pattern 9b' (col. 16, lines 18-23), wherein a liquid crystal material 9a, 9a', 9a" start and stop is deposited on the black matrix.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of von Gutfeld with the teaching of Masazumi by formed a black matrix under a sealed pattern for enabling display of a black which is background color when the liquid crystal is transparent (col. 10, lines 1-10).

***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (571) 272-2292. The examiner can normally be reached on Monday-Friday from 8:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms, can be reached at (571) 272-1787.

Thoi V. Duong – Primary Examiner

December 12, 2007

